

REMARKS

In the Office Action, the Examiner indicated that the previously submitted replacement drawing sheets were deficient because they were not labeled as either "Replacement Drawing Sheet" or "New Sheet." The Examiner therefore requested that new replacement drawings be submitted by Applicants. Formal drawings including the label "Replacement Drawing Sheet" are submitted herein. Applicants respectfully request that the Examiner accept the new replacement drawing sheets.

STATUS OF THE CLAIMS

Claims 1-13 are pending in the present application. In the Office Action, claims 1, 2, and 5-13 were rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Harrison (U.S. Patent No. 6,154,485). Claims 3-4 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Harrison in view of Forssen, et al (U.S. Patent No. 6,173,014). The Examiner's rejections are respectfully traversed.

SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 sets forth a method of transmitting signals from at least two antennae. The claimed method includes the steps determining at least one correlation coefficient between received signals from the at least two antennae and, in response to the at least one determined correlation coefficient, selecting at least one of orthogonal coding and beamforming for transmitting signals using the at least two antennae. Figure 1 depicts one exemplary embodiment of a system 8 that may implement the claimed method. The system 8 includes two transmit antennae 24, 26. A space-time encoder 12 may be used to compute correlation coefficients that

can be used to control relative amounts of beamforming and orthogonal coding. See Patent Application, page 6, line 18 – page 12, line 14 and Figures 1-2.

ARGUMENT

A. Claims 1-2 and 5-13 are not anticipated by Harrison.

Harrison is concerned with receiving signals using combined orthogonal transmit diversity and adaptive array techniques. Harrison describes a coefficient α that may be used to calculate adaptive array filter weights 90 and 92, which may be used by an adaptive array processor 76 to allow a base transmitter to smoothly transition between an orthogonal transmit diversity mode and an adaptive array mode. This smooth transition may allow the base transmitter to smoothly disable the adaptive array mode in proportion to the degradation of the quality of feedback data from a receiver. See Harrison, col. 8, ll. 23-35.

The adaptive array filter weights 90 and 92 described in Harrison are computed from the coefficient α , which may be selected arbitrarily. For example, when the value of the coefficient α is equal to zero, the adaptive array weights 90 and 92 are set equal to 1 so that the transmitter operates in an orthogonal transmit diversity mode. If the coefficient α is set to the reciprocal of the square root of 2, the base transmitter operates in an adaptive radio mode, and if the coefficient α is set to a value between zero and the reciprocal of the square root of 2, the base transmitter operates in a mixed mode. See Harrison, col. 8, ll. 4-35.

In the Office Action, the Examiner continues to allege that the adaptive array filter weights 90 and 92 are correlation coefficients. In particular, the Examiner alleges that the broadest reasonable interpretation of the term "correlation coefficient" may include any coefficient determined between signals received from at least two antennae. Applicants respectfully disagree and submit that the Examiner has adopted a position that runs completely

contrary to the accepted procedures for interpreting the words in a claim. The MPEP sets forth the standard for determining the meanings of words in claims in §2111.01, which states that the words of the claim must be given their "plain meaning" and the "plain meaning" refers to the meaning given to the term by those of ordinary skill in the art. No statute or guideline in the MPEP requires that definitions of the words used in a claim be recited in the claim, contrary to the statements made by the Examiner in the Office Action.

In the present case, Applicants have provided ample evidence that persons of ordinary skill in the art would interpret the term "correlation coefficient" to refer to a well-known statistical quantity that represents the degree to which distributions of two or more quantities are linearly associated. In one embodiment, a correlation ρ_{xy} between two random variables X and Y with expected values μ_X and μ_Y and standard deviations σ_X and σ_Y may be defined as:

$$\rho_{xy} = \frac{\text{cov}(X, Y)}{\sigma_X \sigma_Y} = \frac{E((X - \mu_X)(Y - \mu_Y))}{\sigma_X \sigma_Y}.$$

For example, a Pearson product-moment correlation coefficient can be used to estimate the correlation of X and Y using a series of n measurements of X and Y , which may be written as x_i and y_i where $i = 1, 2, \dots, n$. The Pearson correlation coefficient may be written:

$$r_{xy} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{(n - 1)s_x s_y}$$

where \bar{x} and \bar{y} are the sample means of x_i and y_i , s_x and s_y are the sample standard deviations of x_i and y_i and the sum is from $i = 1$ to n .

Furthermore, Applicants believe that the submitted information amply demonstrates that a person of ordinary skill in the art would not identify either the adaptive array weights or the coefficient α described by Harrison as a correlation coefficient. Thus, Applicants respectfully

submit that Harrison does not describe or suggest determining at least one correlation coefficient between received signals from at least two antennae, as set forth in independent claim 1.

For at least this reason, Applicants respectfully submit that claim 1 and all claims depending therefrom are not anticipated by Harrison and request that the Examiner's rejections of claims 1-2 and 5-13 under 35 U.S.C. 102(e) be withdrawn.

B. Claims 3-4 are not obvious over Harrison in view of Forssen.

To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. As discussed above, Harrison fails to teach or suggest determining at least one correlation coefficient between received signals from at least two antennae, as set forth in independent claim 1. The Examiner admits that Harrison also fails to teach or suggest determining at least one phase correlation coefficient, and so the Examiner relies upon Forssen to teach the use of amplitude and phase information to create a beam. However, Forssen fails to remedy the fundamental deficiencies of Harrison discussed above with respect to claim 1. Furthermore, the cited references are both completely silent with regard to correlation coefficients and therefore fail to provide any suggestion or motivation to modify the prior art to arrive at Applicants' claimed invention.

For at least the aforementioned reasons, Applicants respectfully submit that the present invention is not obvious over Harrison or Forssen, either alone or in combination. Applicants respectfully request that the Examiner's rejections of claims 3-4 under 35 U.S.C. 103(a) be withdrawn.

CONCLUSION


For the aforementioned reasons, it is respectfully submitted that all claims pending in the present application are in condition for allowance. The Examiner is invited to contact the

undersigned at (713) 934-4052 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

Date:

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Mark W. Sincell, Ph.D.
Reg. No. 52,226
Williams Morgan & Amerson, P.C.
10333 Richmond Avenue, Suite 1100
Houston, TX 77042
(713) 934-7000
(713) 934-7011 (Fax)

AGENT FOR APPLICANTS